

Raytheon

Customer Success Is Our Mission



Remediation Status Update

Former Raytheon Facility Wayland, Massachusetts

Jonathan Hone

December 14, 2011

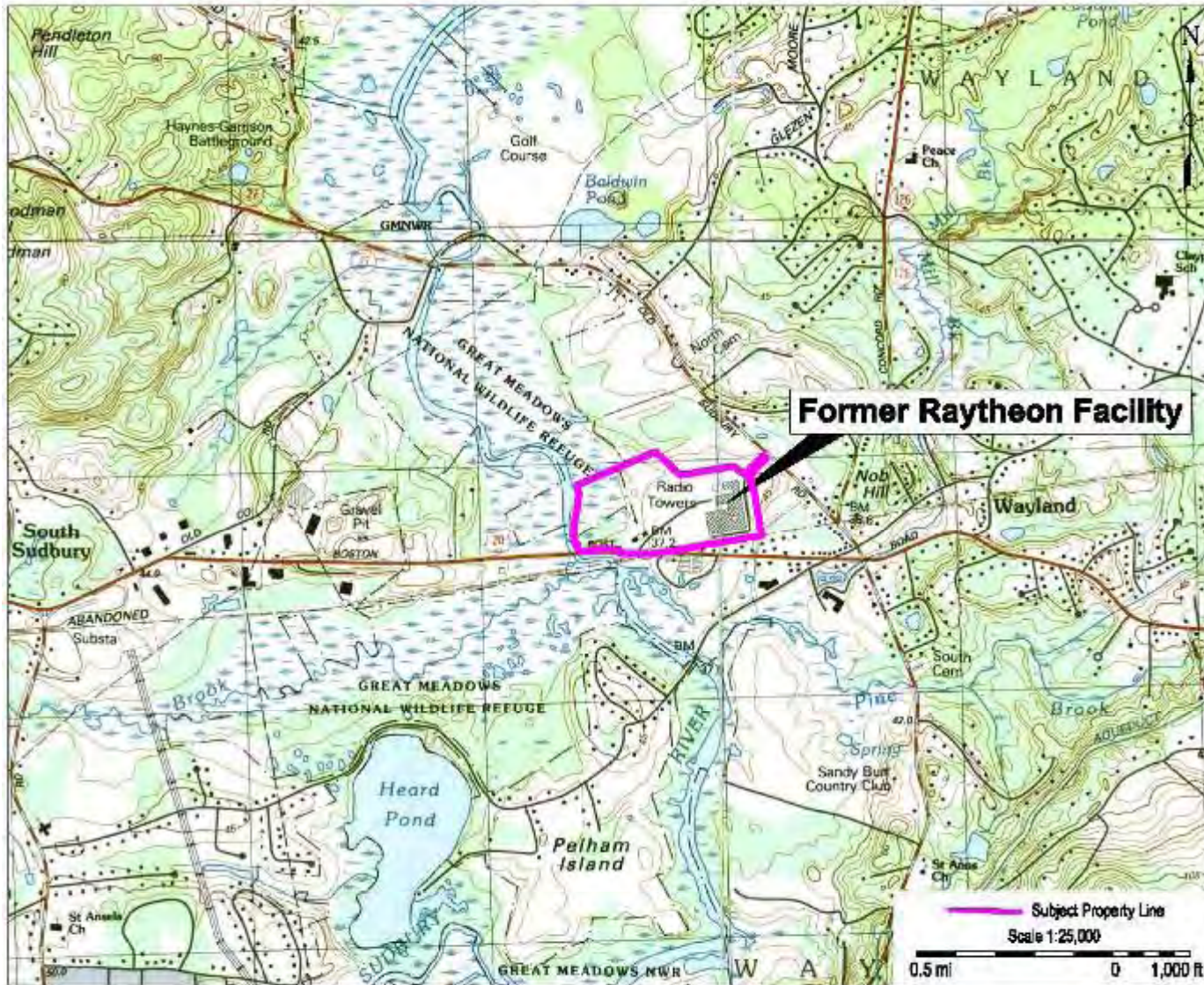
Outline

- Team Introductions

- General Site Overview

- Site Activities Update since May 25, 2011
 - Site-Wide Groundwater Monitoring
 - Northern Area Bioremediation

- Question and Answer Period



Site Overview



Update on Site Activities

Groundwater Gauging & Monitoring

Groundwater Monitoring

- Site-wide groundwater gauging round not conducted due to reduced number of wells on site.
 - 90+ wells decommissioned Southern Area in preparation for site redevelopment

- Groundwater Quality monitoring data summarized in Remedy Operation Status Submittal
 - Northern Area Performance Wells
 - 4 wells sampled in Southern Area (all ND)
 - Cow Common/Sentinel Wells

Cow Common/Sentinel Wells

- Groundwater samples collected from wells in October 2011
 - Pursuant to agreement with Conservation Commission (year 2 of 2)
 - Analyzed for VOCs by Method 8260B

- 2 Compounds detected in October
 - cis-1,2-Dichloroethene - 1.3 µg/L
 - Drinking Water Standard - 70 µg/L
 - Laboratory Method Detection Limit - 1 µg/L
 - Methylene chloride – 2.6 µg/L
 - Drinking Water Standard - 50 µg/L
 - Laboratory Method Detection Limit - 2 µg/L
 - Not previously detected at the former Raytheon site

- No detections of othe. previously identified compounds:
carbon disulfide, chloroform, ethyl-tert-butyl ether, toluene

Northern Area Bioremediation

Enhanced Anaerobic Dechlorination (EAD)

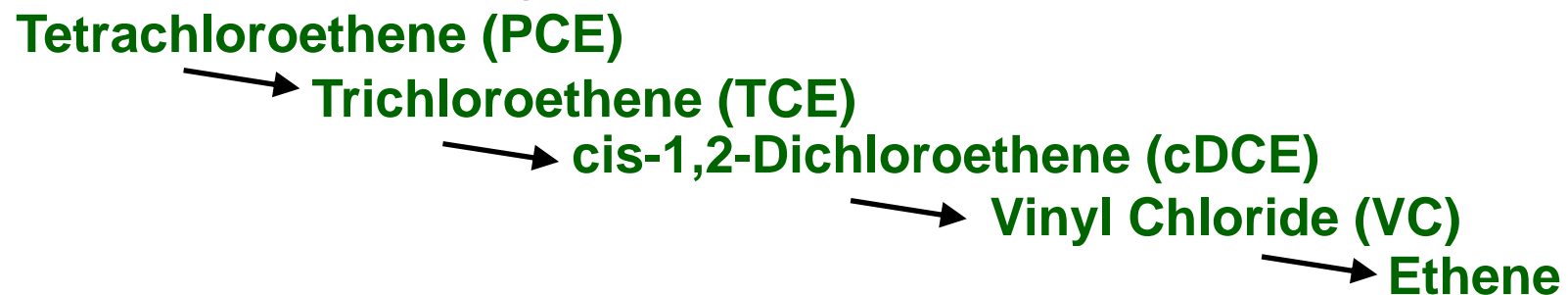
Northern Area



Bioremediation Progression

- Dechlorination: Process by which a consortia of microbes remove chlorine atoms from chlorinated solvents until all that is left is innocuous/harmless ethene
- A carbon source or amendment has been introduced to the naturally occurring microbes via injection wells to jump-start metabolic processes

- Dechlorination Progression

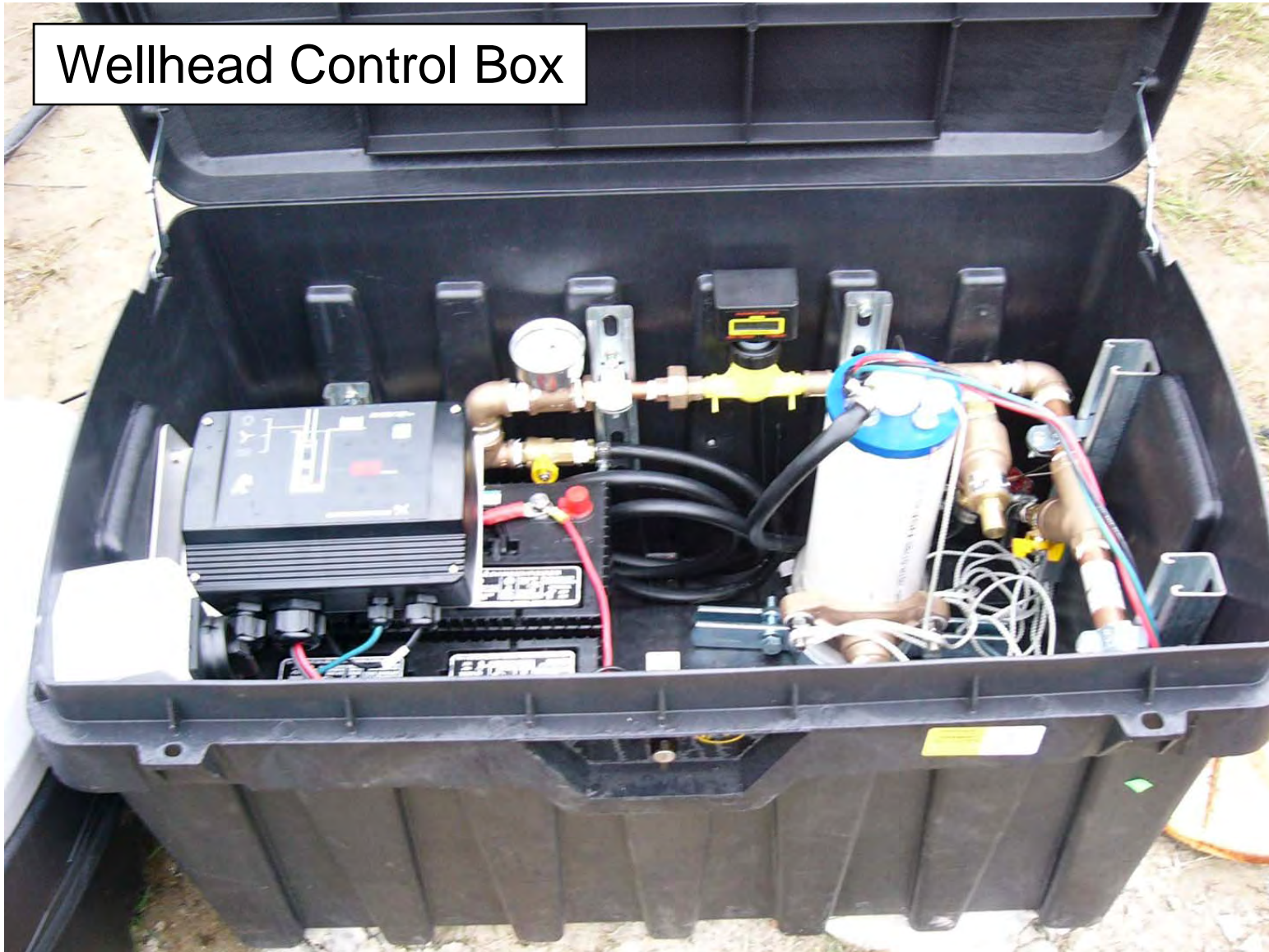


Recirculation System Overview

- EAD program involves recirculation of groundwater within a area to distribute the added electron donor/amendment (carbon source)
- Increases subsurface mixing by injection (upgradient) and extraction (downgradient) of amended groundwater
- Extraction wells are fitted with submersible pumps and control equipment to monitor flow, minimize possibility of leaks, and prevent damage to system
- Solar powered pumps and controls extract groundwater continuously at approximately 3-5 gallons per minute

Recirculation System Details

Wellhead Control Box

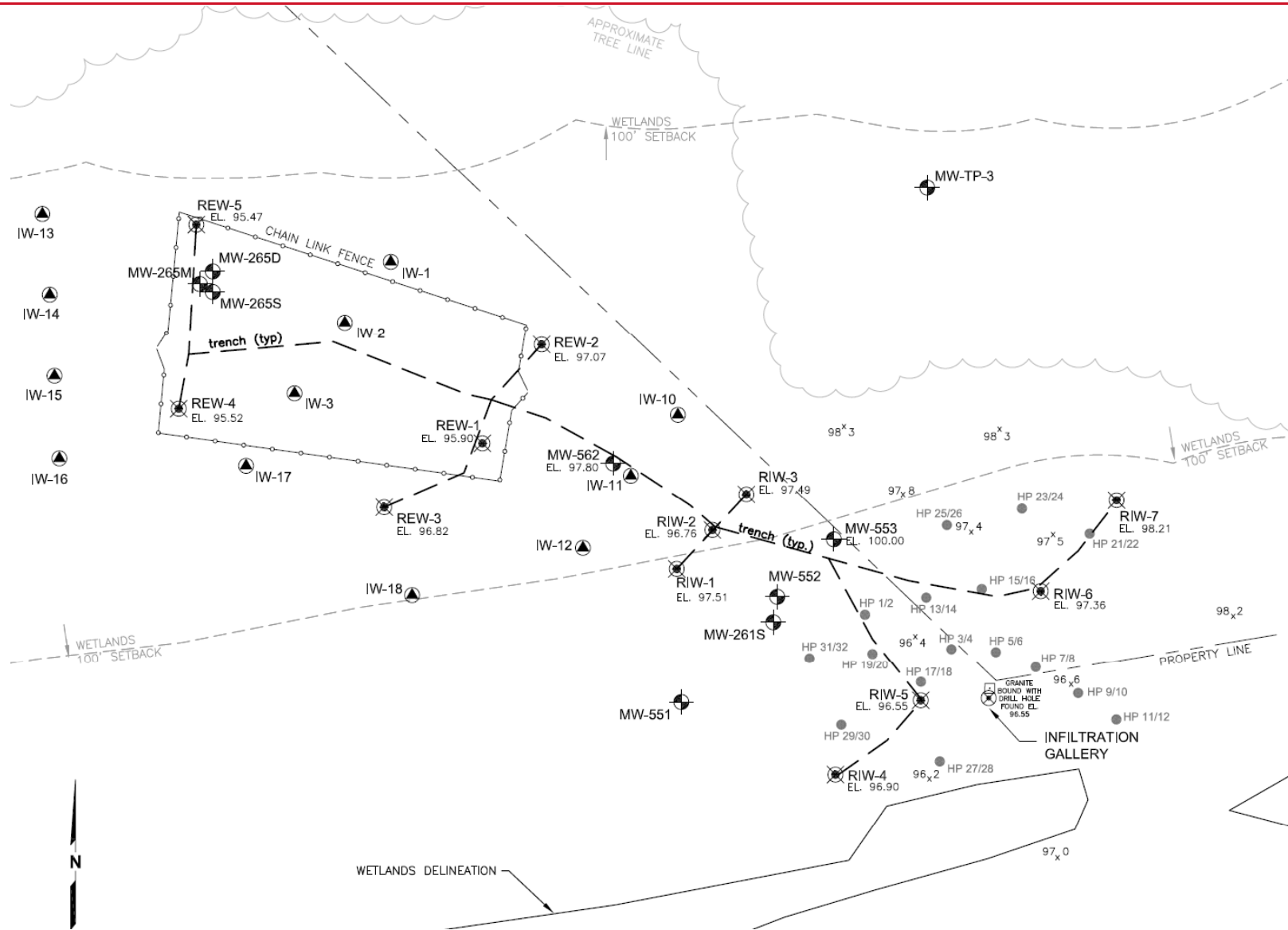


Recirculation System Details

Solar Panels



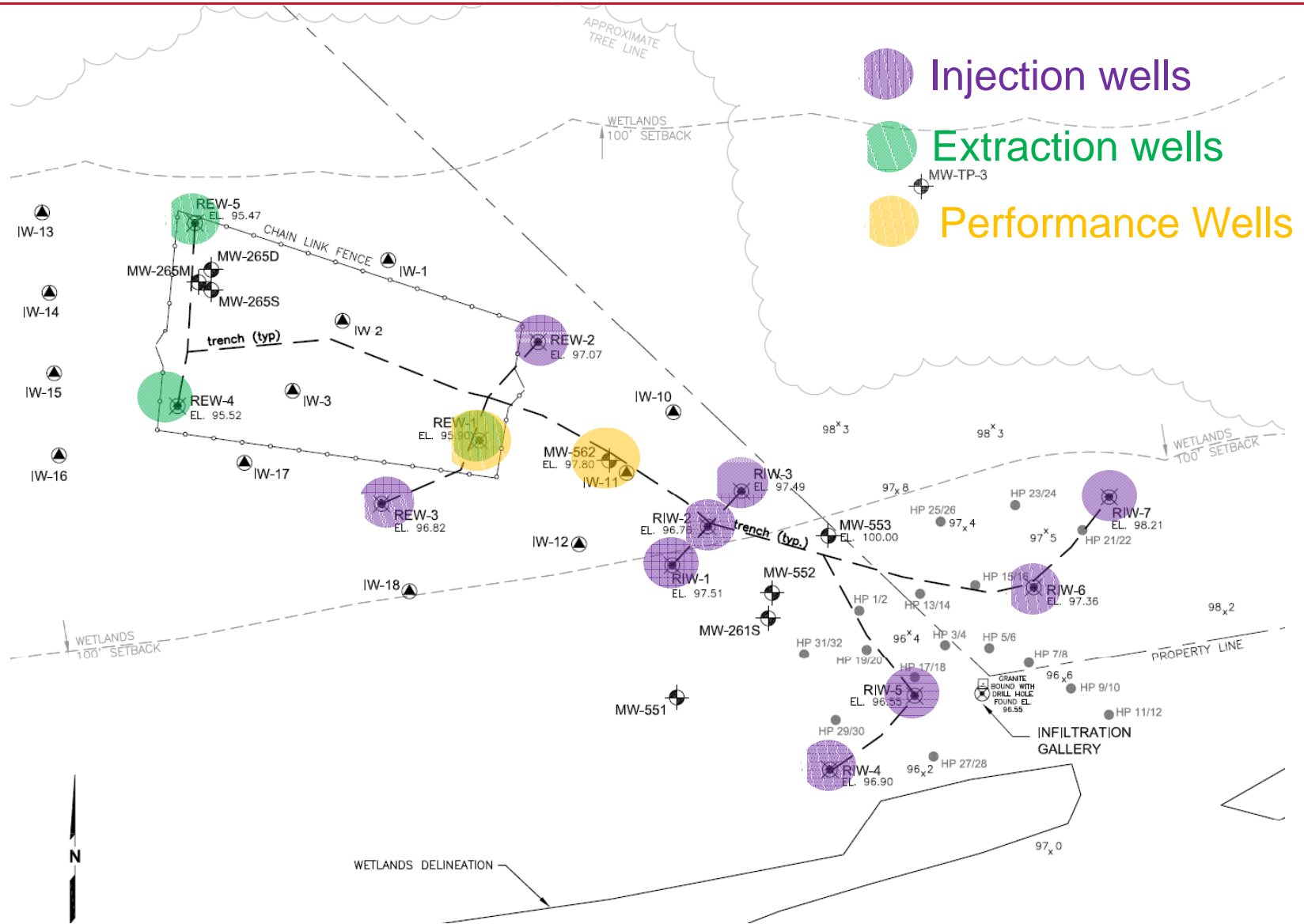
Northern Area Site Plan



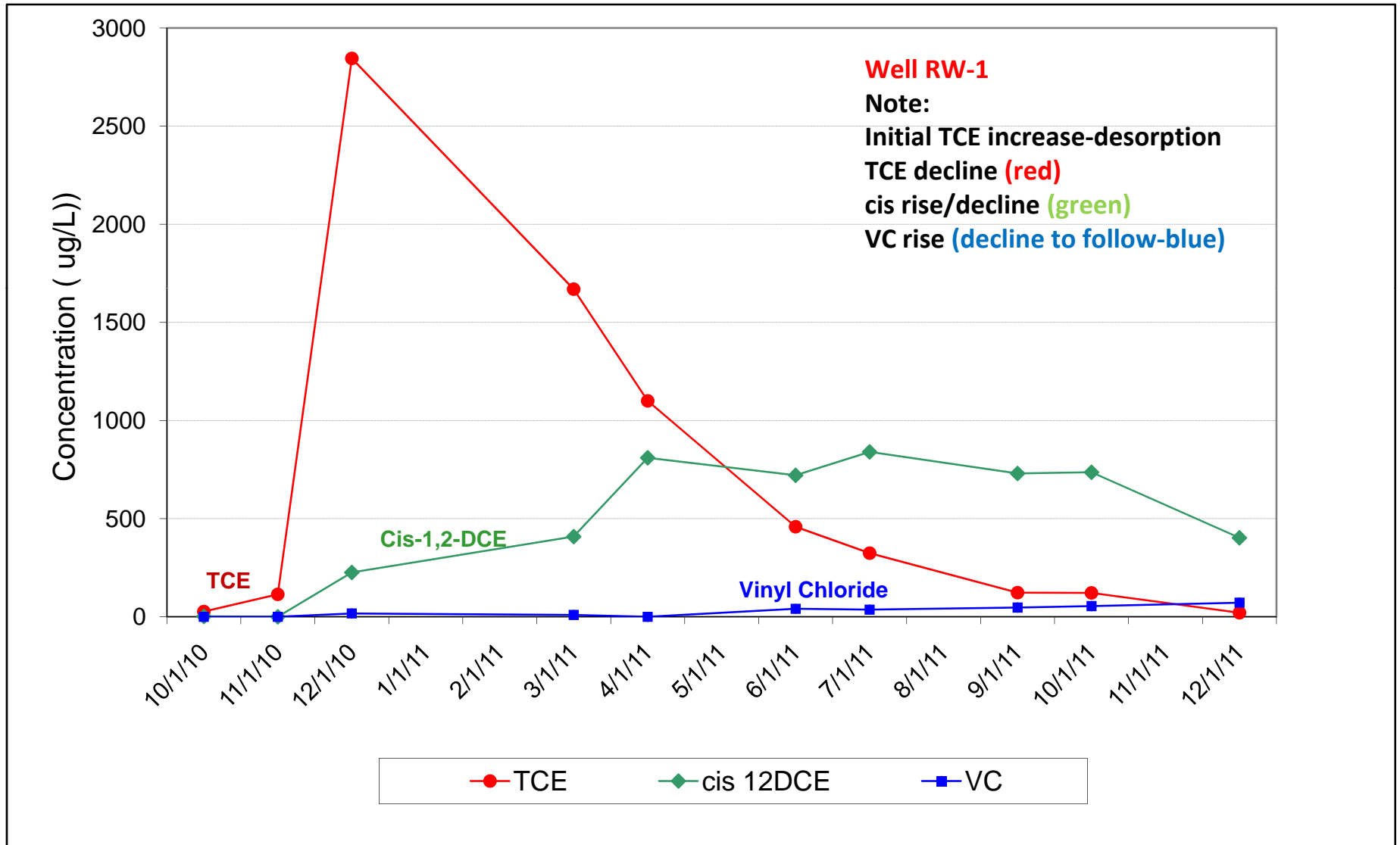
System Update

- Recirculation system initial start up: October 2010
- System expansion in May 2011
 - Three (3) downgradient extraction wells came online (REW-3,4,5)
 - 3rd Solar array was added
- Activities since last system update
 - Piping buried to allow winter operation
 - Recirculated approximately 1,500,000-gallons of groundwater since the program began (1.2 Million YTD)
 - 3 “feeding” events - Methanol, nutrients, pH buffers, cultures added to the system
 - Additional groundwater investigation(via Hydropunch®) to refine injection well locations
 - 4 injection wells (Conservation approved the change from 3 to 4)
 - No Injection Well Chamber installed
 - System is active, and expected to run continuously

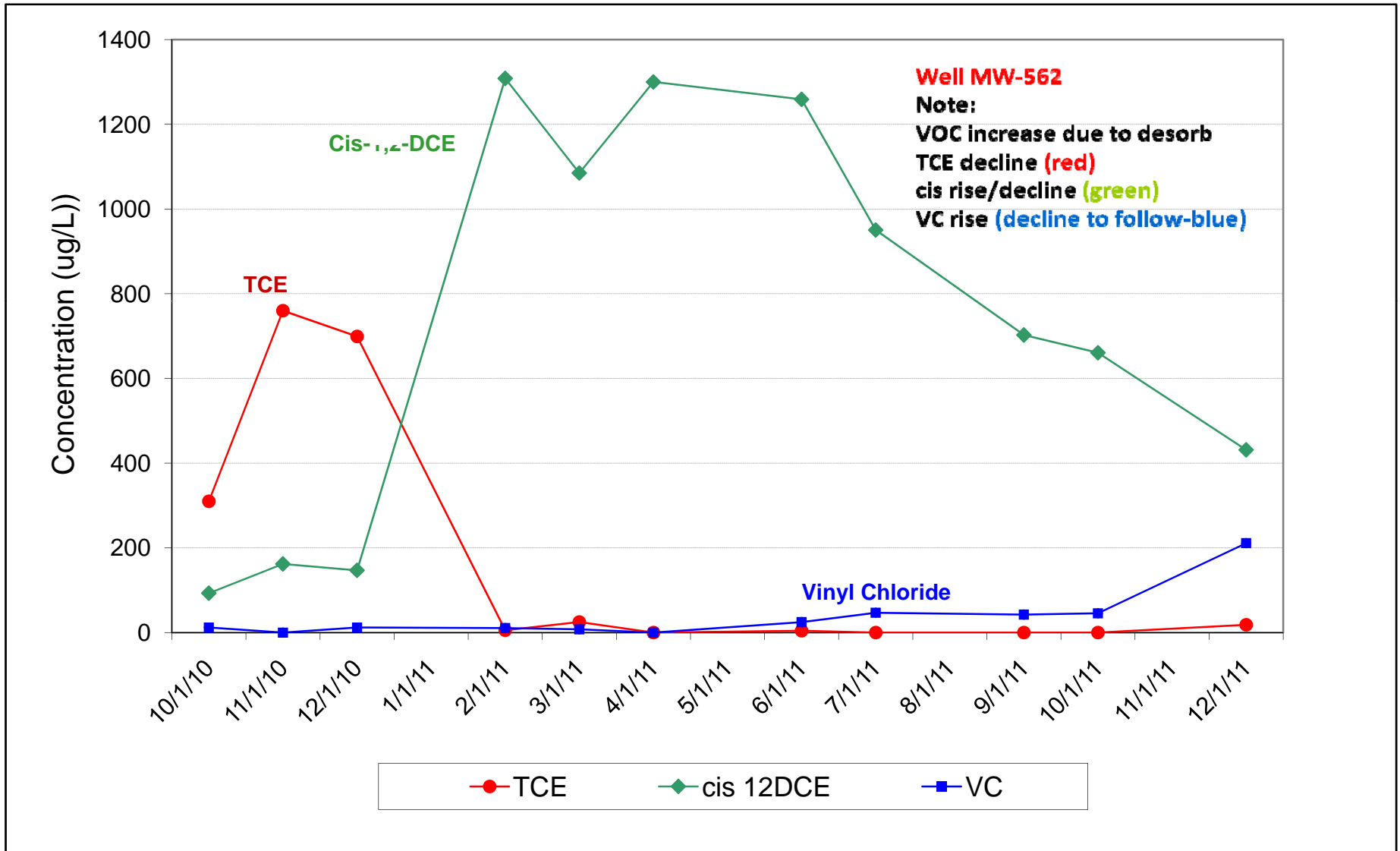
Northern Area Site Plan



REW-1 data



MW-562 data



Q & A

PIP Schedule

- Raytheon will continue to make documents available at the information repositories (Public Library and Board of Health) and extranet web site
www.ermne.com; username – raytheon; password – wayland